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APPLICATION FOR LETTERS PATENT

Accessing Alternate Content

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TECHNICAL FIELD

[0001] This invention relates to content accessibility and, in particular, to accessing alternate content.

BACKGROUND

[0002] Many interactive television systems allow television viewers to use their televisions to browse hypertext markup language (HTML) content, such as Internet websites. However, for some viewers, HTML content displayed on a television can be difficult to read, for example, due to poor eyesight. HTML includes functionality that allows an HTML developer to include alternate content associated with an HTML element. Examples of alternate content include text in a large font, or an audio description of an image. Some HTML browser applications written for use on computer systems include functionality for accessing alternate content, but typically rely on pointing devices, such as a mouse. Unfortunately, interactive television systems generally support user interaction through a television remote control and do not include a pointing device. As such, interactive television systems lack a mechanism for allowing viewers to access alternate content in HTML documents.

SUMMARY

[0003] Access to alternate content in documents rendered using an interactive television viewing system is described. A browser or other rendering engine that supports access to alternate content determines which elements in the document may receive focus, based on whether or not an accessibility mode is active. When an accessibility mode is active, the list of focusable elements may contain

1 elements that, by default, are not focusable elements, but that have associated
2 alternate content. An icon or other demarcation, either audio or visual, can be
3 used to indicate to the user whether or not an accessibility mode is active.
4 Furthermore, an input device, such as a television remote control can be
5 configured to provide a mechanism for activating and deactivating an accessibility
6 mode.

7 8 **BRIEF DESCRIPTION OF THE DRAWINGS**

9 [0004] The same numbers are used throughout the drawings to reference like
10 features and components.

11 [0005] Figure 1 illustrates an exemplary interactive television system in which
12 access to alternate content may be implemented.

13 [0006] Figure 2 illustrates select components of a client device implemented to
14 support access to alternate content.

15 [0007] Figure 3 illustrates an example display of HTML content with an
16 accessibility mode inactivated.

17 [0008] Figure 4 illustrates an example display of HTML content with an
18 accessibility mode activated.

19 [0009] Figure 5 illustrates an example display of alternate content associated
20 with a text element.

21 [0010] Figure 6 illustrates an example display of alternate content associated
22 with an image element.

23 [0011] Figure 7 illustrates rendering of alternate audio content associated with
24 an image element.

1 [0012] Figure 8 illustrates an exemplary method for providing access to
2 alternate content.

3 [0013] Figure 9 illustrates an exemplary method for rendering alternate content.
4

5 **DETAILED DESCRIPTION**

6 [0014] The following discussion is directed to accessing alternate content
7 through an interactive television system. Access to alternate content as described
8 herein may be implemented using a browser or other interface or rendering engine
9 that renders documents (e.g., HTML or dynamic HTML) that may contain
10 elements with associated alternate content. As described, the browser or other
11 rendering engine provides a mechanism for accessing alternate content through an
12 interactive television system using, for example, a television remote control.
13

14 **Exemplary Interactive Television System**

15 [0015] Figure 1 illustrates an exemplary interactive television system 100,
16 which includes client device 102, display device 104, and various input devices
17 that interact with the client device. Client device 102 may be implemented in
18 many forms, including as a television set-top box, a game console, a satellite
19 receiver, a digital video recorder, a television, a personal computer system, a
20 cellular telephone, and a personal multi-modal device.

21 [0016] Client device 102 includes a wireless receiving port 106 (e.g., an
22 infrared (IR) wireless port) for receiving wireless communications from a remote
23 control device 108, a handheld device 110 (such as a personal digital assistant
24 (PDA) or handheld computer), or other wireless device, such as a wireless
25 keyboard. Additionally, a wired keyboard 112 may be coupled to client

1 device 102 for communicating with the client device. In alternate embodiments,
2 remote control device 108, handheld device 110, and/or keyboard 112 may use an
3 RF communication link (or other mode of transmission) to communicate with
4 client device 102. In another alternate embodiment, client device 102, display
5 device 104, and an input device may be implemented as a single hardware unit,
6 such as a cellular telephone or as a handheld device similar to handheld
7 device 110.

8 [0017] In the exemplary system described herein, HTML content navigation is
9 performed by a user using directional inputs by pressing arrow buttons 114 of
10 remote control 108, arrow keys or other inputs associated with handheld
11 device 110, or arrow keys 116 of keyboard 112. Such keys might comprise four
12 orthogonal direction keys (up, down, left, and right), or might allow movement in
13 additional directions, as with one multi-directional key. For example, by pressing
14 the arrow buttons, a viewer can move a colored indicator from one focusable
15 element to another. The viewer can select an element, to cause the browser to
16 perform some functionality associated with the selected element. For example, by
17 pressing a "select" button on remote control 108 while a button associated with an
18 HTML document has the focus, causes the browser to perform the functionality
19 associated with the button.

20 [0018] Users can activate an accessibility mode using an input device, for
21 example, by pressing an accessibility button 118 on remote control 108. Once in
22 the accessibility mode, alternate content can be rendered by focusing on an
23 element that has associated alternate content or alternatively, by selecting a
24 focused element (e.g., when a viewer presses a "select" button on the remote
25 control).

1 **[0019]** An element may also have multiple instances of associated alternate
2 content. For example, an image element may have a first alternate content that
3 consists of a textual description of the image, a second alternate content that
4 consists of a more detailed textual description of the image, and a third alternate
5 content that consists of an audio description of the image. In such an
6 implementation, when a user selects an element that has associated alternate
7 content, the first alternate content is rendered; pressing the select button a second
8 time causes the second alternate content to be rendered; and so on. To support
9 elements with multiple instances of alternate content, the television viewing
10 system 100 may also include one or more mechanisms that allow a viewer to
11 return to the standard element content (i.e., the content associated with an element
12 that is displayed when the accessibility mode is not active). For example, while an
13 accessibility mode is active, pressing a particular button on remote control 108
14 causes the standard image associated with an image element to be displayed
15 instead of an associated textual description of the image that may be displayed as
16 alternate content associated with the image element.

17 **[0020]** Client device 102 includes a rendering engine for generating a video
18 signal and/or an audio signal, both of which are communicated to display
19 device 104. The video signals and audio signals can be communicated from client
20 device 102 to display device 104 via an RF (radio frequency) link, S-video link,
21 composite video link, component video link, or other communication link.
22 Although not shown in Figure 1, a particular client device 102 may include one or
23 more lights or other indicators identifying the current status of the client device.
24 Additionally, a particular client device 102 may include one or more control
25 buttons or switches (not shown) for controlling operation of the client device.

Exemplary Client Device

[0021] Figure 2 is a block diagram illustrating select components of a client device 102 implemented to support access to alternate content as described herein.

Client device 102 may be implemented as, but is not limited to, a television set-top box, a game console, a satellite receiver, a digital video recorder, a television, a personal computer system, a cellular telephone, or a personal multi-modal device.

[0022] Client device 102 includes a processor 202, a memory 204, a display interface 206, an audio output 208, and a video output 210. Operating system 212, rendering engine 214, and other applications 216 are stored in memory 204 and executed on processor 202. Display interface 206, audio output 208, and video output 210 provide mechanisms for client device 102 to communicate documents rendered by rendering engine 214 to display device 104.

[0023] To support alternate content accessibility as described herein, rendering engine 214 includes focusable element identifier 218 and content selector 220. Focusable element identifier 218 determines, based on whether or not an accessibility mode is active, which elements in a document to be rendered are focusable. When accessibility mode is active, some elements that, by default, are not focusable (e.g., an image element in an HTML document), but which have associated alternate content (e.g., a textual or audio description of an image), are added to a list of focusable elements.

[0024] HTML documents are written according to a standard HTML specification, such as the HTML4.01 specification, which defines the structure of HTML documents, including HTML elements and the various attributes that may be associated with each element. In the described implementation, rendering engine 214 is configured to render an HTML document according to a standard

1 HTML specification. Accordingly, rendering engine 214 determines which
2 elements are focusable when an accessibility mode is inactive based on a list of
3 focusable elements derived from the HTML specification. Similarly, rendering
4 engine 214 determines which elements are focusable when an accessibility mode
5 is active based on attributes associated with each of the elements in a particular
6 HTML document. For example, an image element that is not focusable when an
7 accessibility mode is inactive may become focusable when the accessibility mode
8 is activated if the image element has an associated "alt" attribute used to store a
9 short textual description of the image or an associated "longdesc" attribute used to
10 store a reference to a long textual description of the image. The "longdesc"
11 attribute may also be used to store a reference to other media content, such as an
12 audio file that may, for example, provide an audio description of the image with
13 which it is associated.

14 **[0025]** Content selector 220 determines which content associated with a
15 particular element is to be rendered based on whether or not an accessibility mode
16 is active, and in the case where the accessibility mode is active, also based on how
17 many times a particular element has been selected.

18 **[0026]** For example, when an accessibility mode is not active for an image
19 element, which may have associated alternate content, the image itself is the
20 content to be rendered. When the accessibility mode is activated and the image
21 element has focus and/or is selected (depending on the implementation), the
22 alternate content associated with the image is to be rendered. As described above,
23 the alternate content associated with an element is identified according to a
24 standard specification associated with the HTML document. Furthermore, an
25 element may have multiple instances of associated alternate content. For example,

1 an image may have as alternate content both a textual description of the image and
2 an audio description of the image. The content selector 220 is also used to
3 determine which of multiple alternate content to be rendered. For example, when
4 the element has focus, the first time the element is selected, the first alternate
5 content (e.g., a textual description of the image) is rendered; if the element is
6 selected a subsequent time, then the second alternate content (e.g., an audio
7 description of the image) is rendered. This provides document creators the ability
8 to generate documents in which an element can have various levels of alternate
9 content to facilitate a wide range of viewer accessibility needs, due to, for
10 example, visual or audio impairments of varying degree. The order in which
11 alternate content is rendered may be determined based on an attribute order
12 specified in the HTML specification. Alternatively, rendering engine 214 may be
13 configured to render content associated with alternate content attributes of an
14 element according to an alphabetical ordering of the attributes or according to
15 another pre-defined ordering of attributes.

16 [0027] Alternate content may also be used to direct a user to additional
17 documents. For example, when a user selects an element, the associated alternate
18 content may be, in and of itself, another document that is rendered in a separate
19 browser window. In this case, the viewer may browse the alternate content, which
20 may also include links to yet additional documents. To provide an easy way for a
21 viewer to return to the originally rendered document, the accessibility button 118
22 (or other button on remote control 108) may be configured to cause the interactive
23 television system to close any extraneous windows opened as a result of viewing
24 alternate content, and return to the display of the original document.
25

Accessing Alternate Content

[0028] In the described implementation, alternate content such as HTML may be accessed when an accessibility mode is active. The default is for the accessibility mode to be inactive.

[0029] Figures 3-8 illustrate example renderings of the following example HTML document:

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01
Transitional//EN" "http://www.w3.org/TR/1999/REC-
html401-19991224/loose.dtd">
<html>
  <head>
    <title>Welcome to the Example.com home page</title>
  </head> <body><div align="center">
    <h1></h1>
    <h2>Caring for Injured Animals is Our Passion</h2>
    <form action="moreinfo.html">
      <input type="submit" value="Click Here to Learn
More">
      
    </form>
  </div></body>
</html>
```

[0030] Figure 3 illustrates a representative display of an HTML document 300 when the accessibility mode is inactive, as indicated by icon 302 or other demarcation. In an exemplary implementation, if an HTML document does not contain elements that have associated alternate content, a different icon or no icon at all may be displayed. In an alternate implementation, in addition to displaying icon 302, the document rendering system may also (or alternatively) produce an

1 audio indicator when the document is first rendered to indicate that the
2 accessibility mode is not active. HTML document 300 has elements with
3 associated alternate content, but the alternate content is not rendered because the
4 accessibility mode is not active. The example HTML document 300 includes a
5 title text element 304, a second text element 306, a button element 308, and an
6 image element 310. A focus indicator 312 is displayed around button element 308
7 and indicates that button 308 currently has focus.

8 **[0031]** Figure 4 illustrates the display of HTML document 300 once the
9 accessibility mode has been activated. As noted above, the user can activate this
10 mode by pressing a dedicated or logically assigned button on an input device. As
11 an example, a viewer may have pressed an accessibility mode button 118 on
12 remote control 108 to activate the accessibility mode. Icon 402 indicates that the
13 document is being rendered in accessibility mode. In addition to, or instead of,
14 icon 402, the document rendering system may also produce an audio indicator
15 when the document is first rendered or when the accessibility mode is activated to
16 indicate that the accessibility mode is active. When accessibility mode is
17 activated, elements that are not, by default, focusable, but that have associated
18 alternate content, are added to a list of focusable elements that is maintained by
19 rendering engine 214 based on the specification associated with the document. In
20 the illustrated example, title text element 304 and image element 310 are not
21 focusable elements by default, but have associated alternate content, and are thus
22 added to a list of focusable elements that includes button element 308. Focus
23 indicator 312 indicates that the title text element 304 currently has focus. In an
24 exemplary implementation, focus indicator 312 may appear differently if the
25 selected element has alternate content. For example, the focus indicator may be

1 rendered using a different color, such as blue rather than yellow, or using a
2 different style, such as a dashed line rather than a solid line. If a viewer selects the
3 text element that currently has focus (e.g., by pressing a “select” button on the
4 remote control), the alternate content associated with the element is rendered.

5 **[0032]** Figure 5 illustrates document 300 after a user moves the focus to an
6 element with alternate content. Here, the user selects title text element 304 (as
7 described above). Upon selection, the original text (written in a script font) is
8 replaced with associated alternate content 502. In this case, the standard content
9 text that was rendered using a font that is difficult to read is replaced with the
10 alternate content, which in this case, is the same text rendered using a font that is
11 easier to read. In an alternate implementation, rather than replacing the standard
12 element content with the associated alternate content, the browser may render the
13 alternate content in a separate window.

14 **[0033]** Figure 6 illustrates document 300 after a user moves the focus to an
15 element with alternate content. Here, the user selects image element 310 (as
16 described above). Upon selection, causing alternate content 602 (a textual
17 description of the image) associated with image element 310 to be rendered. If
18 there is additional alternate content associated with image element 310, then
19 selecting the element a second time causes the second alternate content to be
20 rendered.

21 **[0034]** Figure 7 illustrates the rendering of additional alternate content
22 associated with image element 310. Focus indicator 312 indicates that the image
23 element 310 currently has focus. In this example, the second alternate content
24 associated with image element 310 consists of an audio description of the image,
25 indicated in Figure 7 by text bubble 702. When image element 310 is selected for

1 the second time, the audio description is played, for example, through speakers
2 associated with display device 104.

3 4 **Method for Providing Access to Alternate Content**

5 **[0035]** Access to alternate content may be described in the general context of
6 computer-executable instructions, such as application modules, being executed by
7 a computer. Generally, application modules include routines, programs, objects,
8 components, data structures, etc. that perform particular tasks or implement
9 particular abstract data types. Alternate content access may be implemented using
10 any number of programming techniques and may be implemented in local
11 computing environments or in distributed computing environments where tasks
12 are performed by remote processing devices that are linked through various
13 communications networks based on any number of communication protocols. In
14 such a distributed computing environment, application modules may be located in
15 both local and remote computer storage media including memory storage devices.

16 **[0036]** Figure 8 illustrates a method 800 for providing access to alternate
17 content associated with elements of a rendered document. For illustrative
18 purposes, Figure 8 will be described with reference to components illustrated in
19 Figures 1 and 2.

20 **[0037]** At block 802, a browser (or other type of rendering application) receives
21 a document to be rendered.

22 **[0038]** At block 804 the browser determines whether or not an accessibility
23 mode is active, for example by examining an accessibility flag maintained by the
24 browser. Activation of an accessibility mode may be supported by any number of
25

1 implementations. For example, a user may press an accessibility button 118 on a
2 television remote control 108 to toggle into and out of an accessibility mode.

3 **[0039]** If the browser determines that an accessibility mode is not active (the
4 “No” branch from block 804), then method 800 continues at block 808, described
5 below. On the other hand, if the browser determines that an accessibility mode is
6 active (the “Yes” branch from block 804), then at block 806, the focusable element
7 identifier 218 alters a list of focusable elements associated with the document by
8 adding to the list any elements that have associated alternate content. By default
9 the list of focusable elements includes all elements that can, by default, be given
10 focus, such as buttons, text entry boxes, and so on. In accessibility mode, the list
11 of focusable elements also includes elements that, by default, cannot receive focus
12 (e.g., images, plain text, etc.), but that have associated alternate content. By
13 including these elements in the list of focusable elements, a viewer is able to set
14 the focus to and/or select the element and thereby access the associated alternate
15 content. The browser examines the HTML document to identify elements that are
16 focusable, based on the HTML specification. When the accessibility mode is
17 active, an element may be added to the list of focusable elements if the element
18 has an associated alternate content attribute, even if the HTML specification
19 indicates that the element is not focusable.

20 **[0040]** At block 808, the browser renders the document.

21 **[0041]** At block 810, the browser monitors viewer input for an accessibility
22 mode switch. As indicated by the “No” branch from block 810, the browser
23 continues to monitor until an accessibility mode switch indicator is received.
24 When the browser receives an indication of an accessibility mode switch, either
25 from active to inaction or vice versa, method 800 continues at block 806 (the

1 “Yes” branch from block 810), where the focusable element identifier 218 alters a
2 list of focusable elements associated with the document. As described above,
3 when a viewer switches into (i.e., activates) the accessibility mode, elements that
4 are not focusable by default may be added to the list of focusable elements. When
5 a viewer switches out of (i.e., deactivates) the accessibility mode, elements that are
6 not focusable by default may be removed from the list of focusable elements.

7 **[0042]** Figure 9 illustrates an exemplary method for rendering alternate content
8 when the system is in an accessibility mode.

9 **[0043]** At block 902, the rendering engine 214 receives an indication that a
10 viewer has selected an element of a rendered document.

11 **[0044]** At block 904, the rendering engine 214 determines whether or not the
12 selected element has associated alternate content by examining the attributes of the
13 element. If the selected element does not have associated alternate content, then
14 the element is, by default, focusable, and is therefore designed to provide some
15 functionality when selected.

16 **[0045]** At block 906, when it is determined that the selected element does not
17 have associated alternate content (the “No” branch from block 904), the rendering
18 engine 214 performs the function that is associated with the element.

19 **[0046]** At block 908, when it is determined that the selected element does have
20 associated alternate content (the “Yes” branch from block 904), the content
21 selector 220 determines which content associated with the element to render. For
22 example, if the element has only one instance of associated alternate content, then
23 that alternate content is selected. However, if the element has multiple instances
24 of associated alternate content, then the content selector determines which of the
25 multiple instances of associated alternate content is most appropriate to be

1 rendered. As described above, in one implementation, the selection is made based
2 on the number of times the element has been subsequently selected; for example,
3 the first time the element is selected, a first instance of associated alternate content
4 is selected; the second time the element is selected, a second instance of associated
5 alternate content is selected; and so on. In one implementation, the order in which
6 the alternate content is displayed may be based on an attribute order specified in
7 the HTML specification. Any number of other techniques may be used to select
8 an appropriate instance of associated alternate content.

9 [0047] At block 910, the rendering engine 214 renders the selected alternate
10 content. In one implementation, the entire document is re-rendered, with the
11 alternate content in place of the previously rendered content associated with the
12 selected element. Alternatively, only the affected area of the document is re-
13 rendered. In another alternate implementation, the alternate content is rendered in
14 a new browser window.

15 16 Conclusion

17 [0048] Although the systems and methods have been described in language
18 specific to structural features and/or methodological steps, it is to be understood
19 that the invention defined in the appended claims is not necessarily limited to the
20 specific features or steps described. Rather, the specific features and steps are
21 disclosed as preferred forms of implementing the claimed invention.